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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/471,659	12/24/1999	LLOYD D. CLARK JR.	59.0021	7775

26751 7590 10/02/2003

SCHLUMBERGER AUSTIN TECHNOLOGY CENTER
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EXAMINER	
ODOM, CURTIS B	

ART UNIT	PAPER NUMBER
2634	18

DATE MAILED: 10/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/471,659	CLARK ET AL.	
	Examiner	Art Unit	
	Curtis B. Odom	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *14/17, 21-26, 28, 29, and 31-35* is/are allowed.

6)☒ Claim(s) *2-13,18-20 and 30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 February 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. The finality of the office action mailed on 7/14/03 is withdrawn.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 8, 10, 12, 13, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardener et al (U.S. Patent No. 5, 365, 229) in view of Gaikwad et al. (U.S. Patent No. 6, 292, 559).

Regarding claim 8, Gardener et al. discloses a telemetry system for transmitting well-logging data from at least one downhole tool to a surface data acquisition system, the at least one downhole tool having a first tool data input/output interface, the telemetry system comprising:

a down hole telemetry cartridge (Fig. 1, block 17) connected to at least one down hole tool (Fig. 1, block 14) via a second tool data input/output interface (Fig. 1, block 16) connected to the first tool data input/output interface, wherein the downhole telemetry receives a bitstream

for the at least one downhole tool over the second input/ouput interface (column 1, lines 64-67) and comprising:

a transmitter (Fig. 1, block 17 and Fig. 2, column 3, lines 10-15) connected to the second tool data input/output interface, and

a cable driver (Fig. 2, cable driver) having

power level control circuitry having logic to control the transmission power to optimize the total transmission power applied to the wireline cable as a function of a received signal which is a function of cable length, cable material, cable temperature, and cable geometry, wherein it is conventional to implement a cable driver as an amplifier (Fig. 10) to increase the transmission power of the carrier frequency to create a signal suitable for transmission over the cable; and

an uphole telemetry unit (Fig. 1, block 10) connected to the surface data acquisition system via an acquisition computer interface (Fig. 1, block 29) and comprising:

a receiver (Fig. 1, block 28 and Fig. 3, column 3, lines 16-23) connected to the surface data acquisition system having logic operable to receive the analog signals, to demodulate the received signals into a bit stream and to output the bit stream to the acquisition computer via the acquisition computer interface; and

a wireline cable (Fig. 1, block 11, column 3, lines 24-32) providing an electrical connection between the downhole telemetry cartridge and the uphole telemetry unit, wherein the analog signals are transmitted in an uphole direction on the wireline cable.

Gardener et al. does not disclose the apparatus having logic operable to cause transmission of the bitstream as analog signals on a plurality of carrier frequencies and logic operable to receive the analog signals on the plurality of carrier frequencies.

However, Gaikwad et al. discloses a system for transmitting data on a communications channel (Abstract) in which DMT modulation is used for communication between a transmitter and receiver (column 8, lines 26-33). DMT modulation causes transmission of the bitstream as analog signals on a plurality of carrier frequencies. Gaikwad et al. also states that this transmission method can be used in well-logging telemetry (Abstract, column 72, lines 8-20).

An invention must contain novelty. By Gaikwad et al. stating the DMT transmission method could be used, or even potentially used in well-logging telemetry systems renders the claimed system without novelty. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Gardener et al. with the teachings of Gaikwad et al. because DMT modulation divides the frequency band into discrete subchannels, which allows transmitter to avoid the noisy channels and maximize the bit rate using the best subchannels. DMT modulation also reduced crosstalk between channels which allows for transmission at higher bit rates.

Regarding claim 10, Gardener et al. and Gaikwad et al. disclose all the limitations of claim 10 (see previous rejection of claim 8) including logic to cause transmission of signal in a first propagation mode (Fig. 1, column 2, line 64-column 3, line 9).

Regarding claims 12 and 13, Gardener et al. and Gaikwad et al. disclose all the limitations of claims 12 and 13 (see previous rejection of claim 8) except for the receiver comprising logic operable to cause transmission from the receiver to cable driver of a control signal indicative to the power level control circuitry to increase or decrease the total transmission power applied to the wireline cable or for a carrier frequency. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the cable driver

used to increase or decrease the total transmission power in the transmitter could have also been implemented into the receiver. It would perform the same function in the receiver and produce a more reliable transmission signal from the receiver.

Regarding claim 18, Gardener et al. and Gaikwad et al. disclose all the limitations of claim 18 (see previous rejection of claim 8) except for the uplink transmission of data uses a first modulation technique and the downlink transmission of data uses a second modulation technique. However, Gardener discloses that uplink transmission uses twice the bandwidth (2/3) as downlink transmission (1/3) on the same wire (column 3, line 65-column 4, line 6). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that in order to optimize bandwidth and power efficiency that two different modulation schemes would have been used for the two different bandwidths (one modulation scheme for uplink transmission (2/3 bandwidth) and one modulation scheme for downlink transmission (1/3 bandwidth)).

Regarding claim 19, which inherits the limitations of claim 18, Gardener et al. and Gaikwad et al. do not disclose the uplink transmission uses DMT and the downlink uses bi-phase modulation. However, Gardener discloses that uplink transmission uses twice the bandwidth (2/3) as downlink transmission (1/3) on the same wire (column 3, line 65-column 4, line 6). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that in order to optimize bandwidth and power efficiency that two different modulation schemes would have been used for the two different bandwidths (DMT modulation scheme for the larger uplink transmission (2/3 bandwidth) and bi-phase modulation scheme for the smaller downlink transmission (1/3 bandwidth)).

4. Claims 2-7 and 9, 11, 20, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardener et al (U.S. Patent No. 5, 365, 229) in view of Gaikwad et al. (U.S. Patent No. 6, 292, 559) in further view of Baird et al. (U.S. Patent No. 6, 469, 636).

Regarding claim 2, which inherits the limitations of claim 9, Gardener et al. further discloses the downhole telemetry cartridge is integrated into one of the at least one downhole tool (Fig. 2, column 2, lines 29-30).

Regarding claim 3, which inherits the limitations of claim 9, Gardener et al. further discloses the downhole telemetry cartridge further comprises a sample clock operating at a sampling rate within the range of 300 kHz to 500 kHz (column 6, lines 16-23 and column 7, lines 21-25), wherein the uphole receiver contains a clock recovery circuit, therefore, the downhole cartridge must contain a clock which operates at the system frequency of 360 kHz, which is between 300 kHz and 500 kHz.

Regarding claim 4, which inherits the limitations of claim 9, Gardener et al. further discloses a cable driver connected to the cable interface (Fig. 2, cable driver) and having power optimization logic to adjust total output power of the analog signal to a power level optimized for the wireline cable (column 3, lines 16-19), wherein amplifying the power to a convenient level adjusts total output power of the analog signal to a power level optimized for the wireline cable.

Regarding claim 5, which inherits the limitations of claim 4, Gardener et al. further discloses a cable driver, (Fig. 2, cable driver) but does not disclose the cable driver operating from a voltage supply range of at least –15 to 15 volts. However, it would have been obvious to one of ordinary skill in the art at the time the invention that using a cable driver of this range is a

design choice used to obtain a specific power level in a signal. Therefore, this claim does not constitute patentability.

Regarding claim 6, which inherits the limitations of claim 4, Gardener et al. further discloses a cable driver, (Fig. 2, cable driver) but does not disclose the cable driver driving the total output power to the maximum input tolerance power level of the receiver. However, it would have been obvious to one skilled in the art at the time the invention was made to include this feature because using the maximum power would allow for the use of the maximum bit rate for transmission in that channel. Therefore, this feature does not constitute patentability.

Regarding claim 7, which inherits the limitations of claim 6, Gardener et al. further discloses the cable driver (Fig. 2, cable driver) operates to drive the total output power without consideration for cross-talk with other signals, wherein there is no mention that the cable driver of Gardener et al. takes cross-talk into account while driving the signal.

Regarding claim 9, Gardener et al. and Gaikwad et al. disclose all the limitations of claim 9 (see previous rejection of claim 8) including an uphole transmitter operable to transmit signals from the data acquisition system to the at least one down hole tool (Fig. 1, block 10, Gardener et al). Neither disclose the control signals are transmitted simultaneously on the wireline cable in a second propagation mode that is different from the first propagation mode.

However, Baird et al. discloses transmitting controls signals in a wireline well-logging telemetry system simultaneously on a wireline cable to a down hole tool in a second propation mode that is different from the first propagation mode (column 5, line 1-column 6, line 16 and column 10, lins 40-60), wherein each power transmission mode is a different propagation mode and the table (column 10) shows a different mode is used for uplink and down link transmission.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the teachings of Baird et al. into the device of Gardener et al. and Gaikwad et al. in order to avoid using separate cables to transmit each signal which reduces the cost and increases the reliability of the device.

Regarding claim 11, Gardener et al. and Gaikwad et al. disclose all the limitations of claim 11 (see previous rejection of claim 8) including an uphole transmitter operable to transmit signals from the data acquisition system to the at least one down hole tool (Fig. 1, block 10, Gardener et al). Neither disclose the control signals are transmitted simultaneously on a second set of wires to a down hole tool that is different from a first set of wires use to transmit signals uphole.

However, Baird et al. discloses all signals can be transmitted using different cables (column 5, lines 6-8). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the teachings of Baird et al. into the device of Gardener et al. and Gaikwad et al. to reduce distortion and eliminate crosstalk produced by transmitting the signals on the same set of wires.

Regarding claim 20, which inherits the limitations of claim 9, Gardener et al. further discloses the downhole telemetry cartridge is constructed from components capable of operation at temperatures above 150 degrees Celsius (column 3, lines 51-64).

Regarding claims 30, which inherits the limitations of claim 9, Gardener discloses using a wireline cable for transmission (column 3, lines 24-50), but Gardener et al. does not discloses using a heptacable wireline cable. However, Gardener et al. discloses that telemetry signal distortion is a function of cable length, type, and manufacturer (column 1, lines 24-27).

Therefore, it would have been obvious to one skilled in the art at the time the invention that the use of a certain cable can reduce telemetry signal distortion. Therefore, the use of a heptacable is deemed a design choice and does not constitute patentability.

Allowable Subject Matter

5. Claims 14-17, 21-26, 28, 29, and 31-35 are allowable over prior art because prior art does not disclose a well-logging telemetry system which uses an SNR ratio to determine a signal point constellation, modulates and demodulates using a bits per carrier table, and adjusts the power level of carriers to optimize data rate in the system.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 703-305-4097. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Curtis Odom
September 8, 2003

STEPHEN CHIN
SUPERVISORY PATENT EXAMINER
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